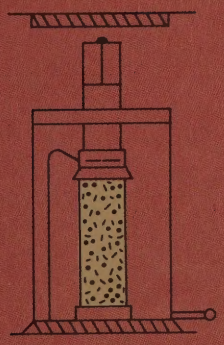
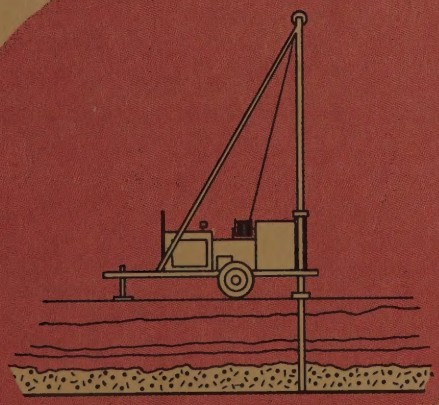
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION

SOIL MECHANICS BUREAU





NEW YORK STATE THRUWAY
EXIT 26
TOLL FACILITY TEST WELL
SCHENECTADY COUNTY

OCTOBER, 1972

SM 238a (1/69)

MEMORANDUM
DEPARTMENT OF TRANSPORTATION

DATE November 20, 1972

SUBJECT TOLL FACILITY TEST WELL, NEW YORK STATE THRUWAY - EXIT 26
SCHENECTADY COUNTY - CONTROL NUMBER CB 1207

FROM Lyndon H. Moore, Soil Mechanics Bureau, Rm. 102, Bldg. 7
By: Jerry R. Howe
TO C. E. Carlson, Regional Director, Region 1

cc J. Sternbach, Construction Subdivision, Rm. 404, Bldg. 5

In the enclosed report you will find a memorandum and supporting data prepared by Mr. C. Bolton, Assistant Engineering Geologist, concerning development of a water test well on the subject project.

Bacteriological and chemical testing of water samples produced results that were higher than acceptable levels.

Two alternatives are given for development of an adequate water supply at this facility. We concur with Mr. Bolton that alternative Number One be incorporated.

JRH:MVM
Enc.

NYSDOT
Library
50 Wolf Road, POD 34
Albany, New York 12232

MEMORANDUM
DEPARTMENT OF TRANSPORTATION

DATE November 20, 1972

SUBJECT FIMT 72-1, NYS THRUWAY, EXIT 26 INTERCHANGE
TEST WELL REPORT
SCHENECTADY COUNTY, PIN 1029.01.311

FROM Clayton L. Bolton, Assistant Engineering Geologist

TO Wesley P. Moody, Associate Soils Engineer

The contract for the construction of the new Exit 26 Interchange of the New York State Thruway included drilling a test well to supply water to the new toll facility building. The prime Contractor for the project, John DiGiulio Inc. retained Layne-Hall Co. of Delmar, N.Y. as the subcontractor for drilling the well.

Layne-Hall Co. moved drilling equipment to the proposed well site and started drilling on September 19, 1972. The well was completed on October 16, 1972. The well construction inspection was by Mr. C. Bolton of this Bureau at the request of Region No. 1.

The well is located at "TJ" Ramp Station 24+62±, 256 feet right and was drilled by the cable tool method. The drilling was progressed the first 25 feet through a light brown till composed of variable percentages of clay, silt, sand and gravel. From 25 feet to 35 feet a water bearing layer of brown coarse sand and gravel with traces of silt and clay was encountered.

The driller was ordered to progress the drilling further since the water was suspected to be polluted. It was desired to penetrate an impervious layer to a deeper aquifer in an attempt to obtain a potable water supply.

The drilling continued through a water bearing layer of fine sand, some gravel, with a trace of silt and clay; brown in color, from 35 to 42 feet. From 42 to 60 feet, a bed of light gray fine sand and silt was penetrated and from 60 to 95 feet, the material obtained was a dark gray dense glacial till composed of clay, silt, some sand and gravel. Black shale bedrock was encountered at a depth of 95 feet. Drilling was halted at this point since water obtained from wells in the shale in this area, is high in sulfide content.

The situation was discussed with Mr. G. Bradley, Project EIC, and Mr. M. DeFeo, Consultant Design Review Engineer of Region No. 1, and it was decided that a gravel pack would be installed at the 25 to 42 foot depth in an attempt to obtain a potable water supply.

A sieve analysis was made of the water bearing material by the Layne-Hall Company together with this writer and it was determined that a No. 3 gravel pack composed of "Cape May" gravel with a particle size range of .039 to .079 millimeters would be used in conjunction with a 45 slot well screen.

The driller backfilled the six inch well from the 95 to 53 foot depth and the twelve inch casing from the 53 to 42 foot depth with run-of-bank gravel while simultaneously extracting the six inch steel casing. The 45 slot, eight inch diameter, stainless steel well screen was attached to the bottom of the six inch diameter casing, centered within the twelve inch diameter temporary steel casing and seated at the 42 foot depth. The gravel pack was then introduced in the annular space between the well screen and the permanent six inch steel casing and the temporary twelve inch casing to the 25 foot depth. The temporary twelve inch steel casing was then extracted to the 26 foot depth.

The well was developed from October 9th through 11th for 23.5 hours by means of a simultaneous surging and pumping operation. The well was pumped at a rate of 10 G.P.M. during the development period. Upon completion of the well development, few fines were being drawn into the well screen and the water was only slightly cloudy.

On October 11th, the well was disinfected by addition of two gallons of Clorox and the solution was circulated throughout the pumping system and well for two hours. The well was then allowed to stand idle for 19 hours.

Upon completion of the well disinfection, a step drawdown test was performed at pumping rates of 5, 10, 15, 20 and 25 G.P.M. with a uniform average drawdown of six inches per gallon of pumping rate. The pumping rate was reduced to 20 G.P.M. four and one-half hours into the test when it was discovered that fine sand was being drawn into the well screen while being pumped at the 25 G.P.M. rate. A sustained yield test was then progressed at the rate of 20 G.P.M. for a seven and one-half hour period. The maximum drawdown below static level during this period was ten feet (static level is 12 feet 10½ inches below the top of casing).

At the conclusion of the pumping test, the water was clear and at a temperature of 50° Fahrenheit. Samples of the water were taken by the Contractor and delivered to Bender Laboratory in Albany for bacteriological and Chemical examination.

On October 16th, the driller placed a concrete grout seal in the annular space between the permanent six inch steel casing and the temporary twelve inch steel casing. The grout was placed from the top of the gravel pack at a depth of 25 feet to a depth of 5 feet below existing ground (the depth at which the waterline will connect with the pitless adapter). The temporary twelve inch steel casing was extracted simultaneous with the placement of the grout seal.

On October 17th, the results of the bacteriological and chemical tests were obtained and they indicated unacceptable levels of Coliform bacteria and total dissolved solids. Based on the bacteriological and chemical tests performed on the water from this well, the following alternatives are available:

1. This well be used in conjunction with a filtration system for the removal of the total dissolved solids and a chlorination system for elimination of the Coliform bacteria.

2. The well for the present toll facility be used. The use of this well would entail additional quantities of pipe and trench excavation. It will also require a larger pump to transmit the water to the new toll facility.

It is recommended that alternative number 1 be incorporated in this contract for the following reasons:

1. The cost of the additional pipe and trench excavation for alternative No. 2 will greatly exceed the cost of the chlorination and filtration systems.

2. The new well will be more accessible than the present well for any pump repair work which may become necessary.

3. The new well is near an electrical power source for the pump however a new power source for present well will be necessary when the demolition of the existing toll facility is completed.

4. The new well will provide a greater quantity of water for the toll facility than will the present well.

Should alternate No. 1 be selected, it is further recommended that the pump be set 34 feet below top of casing and adjusted to a pumping rate no greater than 20 G.P.M. to insure that fine sand will not be drawn into the well system.

Attached to this report are the following:

Test Well Profile	Sheet 5
Pumping Test Chart	Sheet 6
Bacteriological Test Results	Sheet 7
Chemical Test Results	Sheet 8

CLB:MVM
Attachments

NEW YORK STATE THRUWAY
EXIT 26 TOLL FACILITY
TEST WELL PROFILE

Top of Casing
Elevation: 0.00'
Ground Surface
Elevation: -1.00'±

Top of Grout Seal
Elevation: -6.00'±

Static Level
Elevation: -12.87'

Drawdown at 20 GPM
Elevation: -22.79'
Bottom of Grout Seal
Top of Gravel Pack
Elevation: -26.00'

Recommended Pump Setting
Elevation: -34.00

Bottom of Casing
Top of Well Screen
Elevation: -38.00'

Bottom of Gravel Pack
and well screen
Elevation: -43.00'

WELL

Date Started: 9/19/72
Date Completed: 10/16/72
Method: Cable Tool
Driller: Richard Rowe
Drilling Contractor: Layne-Hall Co., Delmar,N.Y.
Static Level: 12' - 10½"
Production: 20 G.P.M.
Pump Test: 34'-0" (Below Top of Casing)

MATERIALS

Screen: Johnson Stainless Steel
8" Diameter, 45 Slot Screen
5'-0" in Length
Gravel Pack: Layne #3
(Particle Size Range: .039-.079)

NOTE: All elevations or depths contained in this report refer to 0.00 at the top of the casing.

NEW YORK STATE THRUWAY, EXIT 26, TOLL FACILITY WELL
PUMPING TEST RESULTS
OCTOBER 12, 1972

Time	Water Level (Below Top of Casing)	Pumping Rate * (G.P.M.)	Drawdown (Below Static Level)
8:30 AM	12'-10½" (Static Level)	0	0'-0"
8:35 AM	14'-10"	5 (start)	1'-11½"
8:45 AM	14'-11"	5	2'-0½"
9:00 AM	14'-10"	5	1'-11½"
9:15 AM	18'-0"	10	5'-1½"
9:30 AM	18'-0"	10	5'-1½"
9:45 AM	19'-9"	15	6'-10½"
10:00 AM	19'-11"	15	7'-0½"
10:15 AM	19'-10"	15	6'-11½"
10:30 AM	19'-10"	15	6'-11½"
10:45 AM	22'-8"	20	9'-9½"
11:00 AM	22'-9½"	20	9'-11"
11:15 AM	22'-9½"	20	9'-11"
11:30 AM	22'-9½"	20	9'-11"
11:45 AM	25'-4"	25	12'-5½"
12:00 AM	25'-4½"	25	12'-6"
12:15 PM	25'-4½"	25	12'-6"
12:30 PM	25'-4½"	25	12'-6"
1:00 PM	25'-5½" (began to draw sand into well)	25	12'-7"
1:15PM	22'-11" (ret. to 20 GPM, sand disappeared)	20	10'-0½"
1:30 PM	22'-10½"	20	10'-0"
2:30 PM	22'-9½"	20	9'-11"
3:30 PM	22'-9"	20	9'-10½"
4:30 PM	22'-9½"	20	9'-11"
5:30 PM	22'-8½"	20	9'-10"
6:30 PM	22'-8½"	20	9'-10"
7:30 PM	22'-9½"	20	9'-11"
8:30 PM	22'-9½"	20	9'-11"

*Pump intake set at 34 feet below top of casing for pump test.

Well Recovery Record

Time	Water Level (Below top of Casing)
8:30 PM (Pump test stopped)	22'-9½"
8:35 PM	13'-9"
8:38 PM (Full Recovery)	12'-10½" (Static Level)

BENDER HYGIENIC LABORATORY

17 HACKETT BOULEVARD ALBANY, NEW YORK 12208

DATE	LAB. NO.	PHYSICIAN	HOSPITAL	Classification	AGE
~~10/13/72~~					
P.W. 3164					

DATE REPORTED 10/16/72 AMOUNT

Layne - Hall Company
20 Hallwood Road
Delmar, N.Y. 12054

Water for bacteriological analysis:

Name of Supply	:	N.Y.S. Contract FIMT 72-1
Owner	:	N.Y.S.- DOT- Exit 26- Thruway
Sampling Point	:	Discharge of Test Pump
Location	:	Rotterdam Junction
Signed by	:	F.B. Cedler

Bacteria per ml = 600/ml

Coliform = 19/100 ml

REPORT 1

BENDER HYGIENIC LABORATORY

17 HACKETT BOULEVARD ALBANY, NEW YORK 12208

DATE	LAB. NO.	PHYSICIAN	HOSPITAL	Classification	AGE
10/12/72	32979				

DATE REPORTED 10/16/72 AMOUNT

Layne - Hall Company
20 Hallwood Road
Delmar, N.Y. 12054

Water for Sanitary Chemical Analysis + Total Dissolved Solids:

Location : Rotterdam Junction - Schtdy County
Owner : N.Y.S. D.O.T.- Exit 26, Thruway
Contract F I M T 72-1

Sampling Point : Discharge of test pump- end of 12 hour test

Color	Less than 5 Units
Turbidity	Less than 5 Units
Odor	Slight Musty
pH	8.2 Units
Carbon Dioxide	1.0 mg/L
Bicarbonate Alkalinity	188 mg/L
Hardness	362 mg/L
Nitrate Nitrogen	0.05 mg/L
Nitrite Nitrogen	Less than 0.005 mg/L
Iron	0.04 mg/L
Manganese	0.00 mg/L
Sulfate	90 mg/L
Chloride	217 mg/L
Total Dissolved Solids	710 mg/L

Robert M. O'Neal, M.D.

00979
LRI